

Energetic Mechanisms Operant During Pulsed Laser Deposition (PLD)

Aaron Fleet, Darren Dale, H.H. Wang, Y. Suzuki, J.D. Brock,
Cornell University, **DMR-0225180**

Understanding the growth of thin films is an important step towards being able to fabricate electronic materials with custom properties. Over the past three years graduate students Aaron Fleet and Darren Dale have built a vacuum system at CHESS that allows *in-situ* x-ray characterization of thin films being grown using pulsed laser deposition sources. The time-resolved x-ray data collection procedure reveals how the arriving atoms in a pulse get incorporated into the growing film, and allows optimization of the growth process for laser, electronic, and magnetic materials.

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Top figure shows x-ray data and theoretical line fit during the growth of 42 monolayers of SrTiO_3 at a rate of 1/11 monolayer deposited per pulse. Bottom shows A. Fleet with the x-ray vacuum chamber.

